



## TITLE OF THE INVENTION

APPARATUS FOR APPLYING A REACTION FORCE TO A PIVOTALLY SUPPORTED PEDAL MEMBER UPON DEPRESSION THEREOF

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

[0001] The present invention relates to an improvement in a pedal reaction force applying apparatus for applying a pedal reaction force to a pedal member whose depressing stroke is electrically detected so that a hydraulically or otherwise operated brake is activated on the basis of the detected depressing stroke of the pedal member.

### 2. Discussion of Prior Art

[0002] There is proposed a brake-by-wire braking system, as a service braking system for a vehicle, in which a depressing stroke (pivot amount) of a pedal member is electrically detected so that an actuator such as a hydraulically operated device and an electrically operated motor is activated on the basis of the detected depressing stroke. In such a braking system, the pedal member receives only very small amount of pedal reaction force which is generated merely by a return spring provided in the pedal member. Therefore, there is a problem that the brake-by-wire braking system is difficult to operate, for a driver accustomed to a hydraulically or vacuum boosted braking system. In view of this, Patent Document 1 proposes a pedal reaction force applying apparatus which positively applies a pedal reaction force to a pedal member, by using a spring member such as torsion coil spring. Patent Document 2 proposes to displace a spring seat by rotating a cam with an electric motor, for changing a pedal reaction force depending upon a running condition such as snow-covered road surface. Patent Document 3 proposes to generate a braking force by using a depressing-force sensor and a stroke sensor, and control an amount of a pedal reaction force on the basis of difference between the generated braking force and its target value.

[0003] [Patent Document 1] JP-A-2001-239930

[Patent Document 2] JP-A-2001-247020

[Patent Document 3] JP-A-2001-278021

[0004] However, in the above-described conventional pedal reaction force applying apparatus, due to difference between characteristic of a pedal

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